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Number 160860 מספר:

Date תאריך:

Ante / Post-dated הוקדם / נדחה

13-03-2004

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חוק הפטנטים, תשכ"ז - 1967
PATENTS LAW, 5727-1967

בקשה לפטנט
Application for Patent

אני, (שם המבקש, מענו - ולגבי גוף מאוגד - מקום התאגדותו)
I, (Name and address of applicant, and, in case of a body corporate, place of incorporation)

Kapro Intelligent Tools Ltd.
Kadarim 12390
(an Israeli Company)

קפרו מכשירים חכמים בע"מ
קדרים 12390
(חברה ישראלית)

Owner, by virtue of Right of Law הדין בעל אמצאה מכח

of an invention the title of which is: ששמה הוא:

(בעברית) פלס דיגיטלי
(Hebrew)

DIGITAL SPIRIT LEVEL

(באנגלית)
(English)

hereby apply for a patent to be granted to me in respect thereof מבקש בזאת כי ינתן לי עליה פטנט.

* בקשת חלוקה Application for Division	* בקשת פטנט מוסף - Application for Patent of Addition	* דרישת דין קדימה Priority Claim		
מבקשת פטנט from Application	* לבקשה/לפטנט to Patent/Application	מספר/סימן Number/Mark	תאריך Date	מדינת האיגוד Convention Country
No. _____ מס' _____ dated מיום	No. _____ מס' _____ dated מיום			
* יפוי כח: כללי/מיוחד - רצוף בזה/עוד יוגש P.O.A.: general/specific - attached/to be filed later Has been filed in case _____ הוגש בעניין				
המען למסירת הודעות ומסמכים בישראל Address for Service in Israel קפרו מכשירים חכמים בע"מ קדרים 12390				
חתימת המבקש Signature of Applicant Nimrod Kay		היום 10 בחודש מרס שנת 2004.		

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This form, impressed with the Seal of the Patent Office and indicating the number and date of filing, certifies the filing of the application, the particulars of which are set out above.

* מחק את המיותר Delete whatever is inapplicable

פלס דיגיטלי

DIGITAL SPIRIT LEVEL

DIGITAL SPIRIT LEVEL

Field of the Invention

The invention is in the field of digital spirit levels.

Background of the Invention

Conventional digital spirit levels have either a single leveling surface or a pair of opposite and parallel leveling surfaces for placing on a surface, a horizontal bubble vial for indicating the inclination of a surface with respect to the horizontal, a vertical bubble vial for indicating the inclination of a surface with respect to the vertical, and an inclination measurement module for measuring the inclination of a surface for display on a LCD display. Conventional digital spirit levels having a pair of opposite and parallel leveling surfaces have four attitudes for placing on a surface as follows: either an upright attitude (see Figure 1) or an upside down attitude (see Figure 2) for placing on a horizontal surface, and either a right hand side up attitude (see Figure 3) or a right hand side down attitude (see Figure 4) for placing on a vertical surface. Conventional digital spirit levels display the inclination of a horizontal surface with respect to 0° horizontal in upright digits facing a user in both their upright and upside down attitudes (see Figures 1 and 2), and also a vertical surface with respect to 0° horizontal in both their right hand side up and right hand side down attitudes in sideways facing digits (see Figures 3 and 4) which is inconvenient for a user.

Summary of the Invention

The present invention is for a novel digital spirit level having a housing including a leveling surface for placing on a surface, and an inclination measurement module for measuring the inclination of the surface for display on a LCD display wherein the LCD display displays the inclination of a near vertical surface in upright digits facing a user, thereby enabling the user to readily read

same. The digital spirit level preferably displays the inclination of a near vertical surface with respect to 0° vertical instead of 0° horizontal thereby further facilitating reading of a near vertical surface's inclination.

Brief Description of the Drawings

In order to understand the invention and to see how it can be carried out in practice, a preferred embodiment will now be described, by way of a non-limiting example only, with reference to the accompanying drawings in which similar parts are likewise numbered, and in which:

Fig. 1 is a pictorial view showing the use of a conventional digital spirit level in its upright attitude for displaying the inclination of a 0.3° inclined near horizontal surface with respect to the horizontal;

Fig. 2 is a pictorial view showing the use of Figure 1's digital spirit level in its upside down attitude for displaying the inclination of the same 0.3° inclined near horizontal surface with respect to the horizontal;

Fig. 3 is a pictorial view showing the use of Figure 1's digital spirit level in its right hand side up attitude for displaying the inclination of a 1.0° inclined near vertical surface with respect to the vertical;

Fig. 4 is a pictorial view showing the use of Figure 1's digital spirit level in its right hand side down attitude for displaying the inclination of the same 1.0° inclined near vertical surface with respect to the vertical;

Fig. 5 is a combined pictorial view and block diagram of a digital spirit level in its upright attitude for displaying the inclination of a 0.3° inclined near horizontal surface with respect to the horizontal;

Fig. 6 is a pictorial view showing the use of Figure 5's digital spirit level in its upside down attitude for displaying the inclination of the same 0.3° inclined near horizontal surface with respect to the horizontal;

Fig. 7 is a pictorial view showing the use of Figure 5's digital spirit level in its right hand side up attitude for displaying the inclination of a 1.0° inclined near vertical surface with respect to the vertical; and

Fig. 8 is a pictorial view showing the use of Figure 5's digital spirit level in its right hand side down attitude for displaying the inclination of the same 1.0° inclined near vertical surface with respect to the vertical.

Detailed Description of Preferred Embodiment of the Invention

Figure 5 shows a digital spirit level 10 including a pair of opposite and parallel leveling surfaces 11 and 12 for placing on a surface, a horizontal bubble vial 13 for indicating the inclination of a surface with respect to the horizontal, a vertical bubble vial 14 for indicating the inclination of a surface with respect to the vertical. The digital spirit level 10 also includes a power supply 16, a controller 17, an inclination measurement module 18 for measuring the inclination of a surface, an attitude detection module 19 for detecting the attitude of the digital spirit level 10, and a display driver 21 for displaying the inclination of a surface on a LCD display 22.

Exemplary inclination measurement modules are illustrated and described *inter alia* US Patent 4,912,662 to Butler et al., and US Patent 5,335,190 to Nagle et al. The attitude detection module 19 is capable of detecting whether the digital spirit level 10 is in its upright attitude placed on a horizontal surface, its upside down attitude placed on a horizontal surface (see Figure 6), its right hand side up attitude placed on a vertical surface (see Figure 7) or a right hand side down attitude placed on a vertical surface (see Figure 8). The inclination measurement module 18 and the attitude detection module 19 can be implemented as a single module.

The digital spirit level 10 displays the inclination of a horizontal surface with respect to 0° horizontal on the LCD display 22 in uprights digits in both its upright attitude and its upside down attitude (see Figures 5 and 6) similar to a conventional digital spirit level. The digital spirit level 10 displays the inclination of a vertical surface with respect to 0° vertical on the LCD display 22 in uprights digits in both its right hand side up attitude and its right side down attitude (see Figures 7 and 8).

While the invention has been described with respect to a limited number of embodiments, it will be appreciated that many variations, modifications, and other applications of the invention can be made within the scope of the appended claims.

Claims:

1. A digital spirit level comprising a housing including a leveling surface for placing on a surface, and an inclination measurement module for measuring the inclination of the surface for display on a LCD display wherein said LCD display displays the inclination of a near vertical surface in upright digits facing a user, thereby enabling the user to readily read same.

2. The level according to claim 1 wherein said LCD display displays the inclination of the near vertical surface with respect to 0° vertical in upright digits facing the user.

3. A digital spirit level substantially as described hereinabove and as shown in the attached drawings.

Respectfully submitted,

Simon Kay

By:
Simon Kay, Intellectual Property Manager
Kapro Intelligent Tools Ltd.

KAPRO INTELLIGENT TOOLS LTD SHEET 1 OF 3

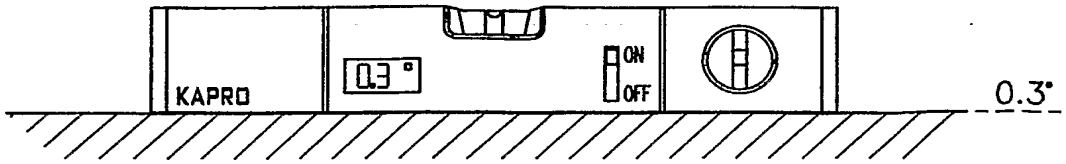

FIG.1
(PRIOR ART)

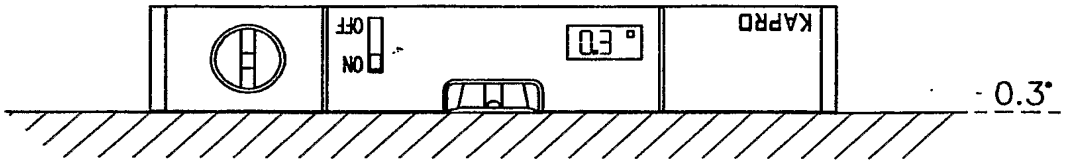

FIG.2
(PRIOR ART)

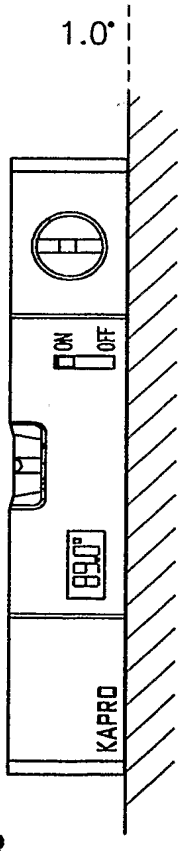

FIG.3
(PRIOR ART)

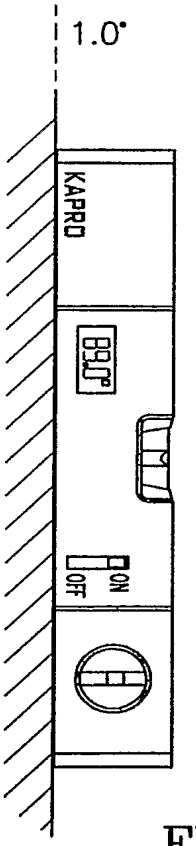

FIG.4
(PRIOR ART)

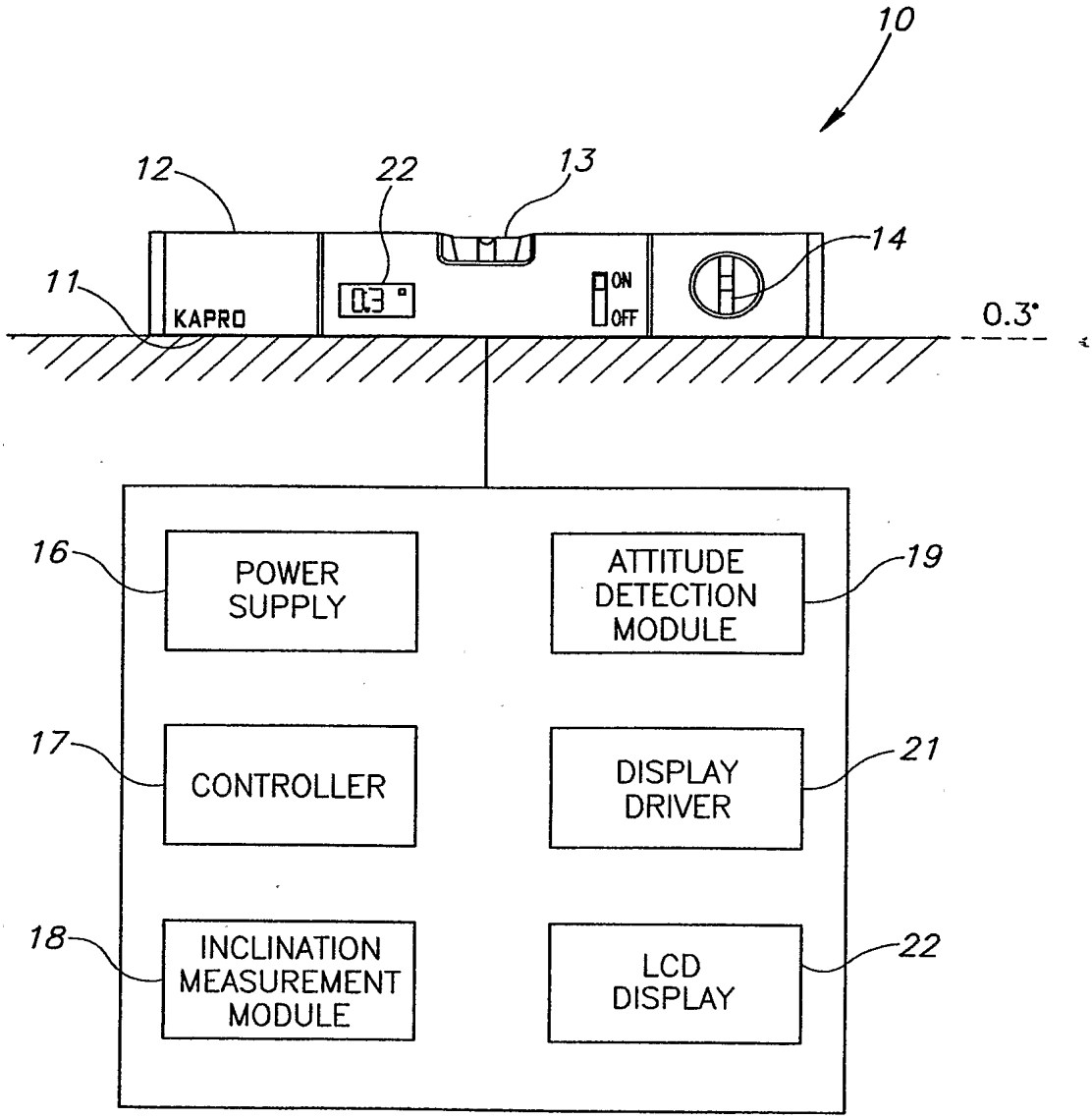
10
12
22
13
14
11
KAPRO
0.3°
ON
OFF
0.3°
16
POWER SUPPLY
ATTITUDE DETECTION MODULE
19
17
CONTROLLER
DISPLAY DRIVER
21
18
INCLINATION MEASUREMENT MODULE
LCD DISPLAY
22

FIG.2

3/3

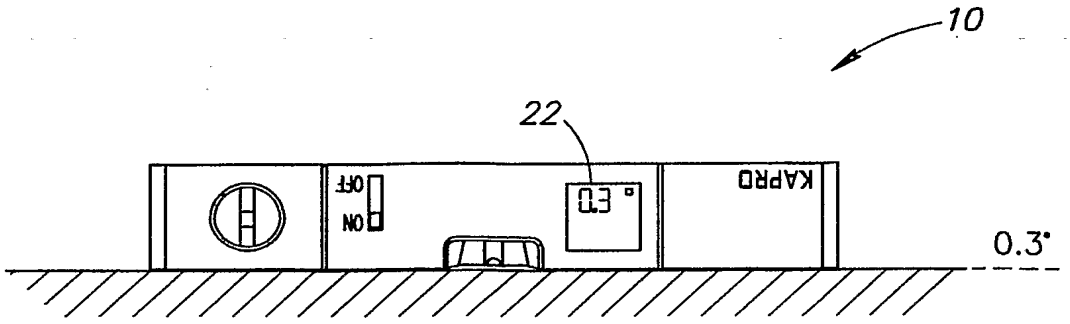

FIG.6

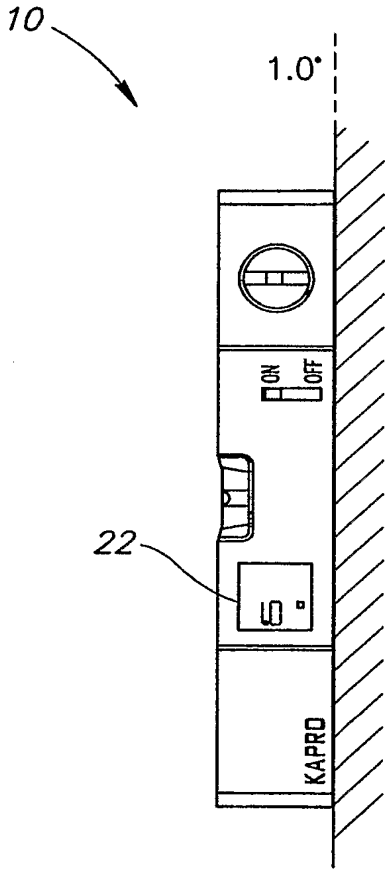

FIG.7

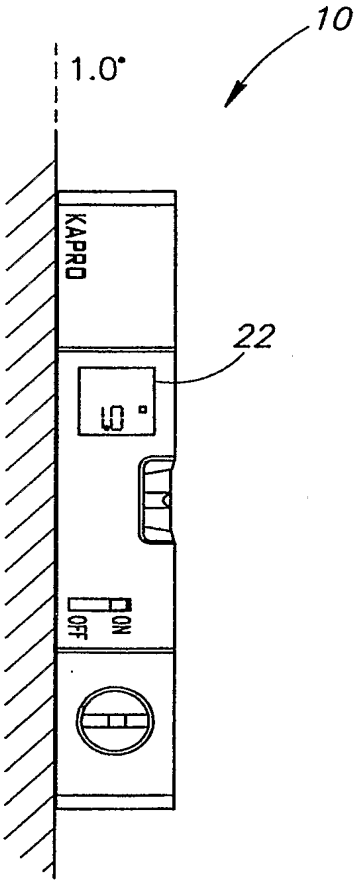

FIG.8